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[OFFICIAL NOTICE.]

Annual Meeting, American Gas Light Association.

LAWRENCE, MASS., Aug. 28, 1889.

Section 12 of the Constitution is as follows:

"Section 12. *Application for Active Membership, or for Associate Membership, or for transfer from Associate to Active Membership, must be received by the Secretary at least ten days prior to the meeting at which the application is acted on.*"

To the Members of the Association: Gentlemen—As already announced, the Seventeenth Annual Meeting of the Association will be held at Baltimore, Md., on Wednesday, Thursday, and Friday, Oct. 16, 17, and 18. The headquarters of the Association will be at the Carrollton Hotel, which is conducted on the American plan. The meetings of the Association will be held in the Concert Hall of the Concordia Building, on German street near Eutaw.

As, in my circulars of July 29, I had considerable to say in the way of impressing upon members the necessity of procuring rooms in advance at the hotel, it is not necessary for me to say much on this point now. I would merely add, as a reminder, that the rate at the Carrollton is $3 per day, and if the members take the pains to write in advance for rooms they will all be taken care of.

I am assured by the Committee that the hall selected for the meetings of the convention is in all respects a desirable place. Certainly this is a good cause for rejoicing, because a suitable hall adds greatly to the pleasure of the meeting.

There is no change in the literary part of the programme, which is as follows:

"Fuel Gas," by Walton Clark.

"Gas Coals of the United States," by H. C. Adams.

"Care and Operation of Gasholders," by C. L. Rowland.

"Water Gas," by F. H. Shelton.

"Leakage and Condensation," by E. C. Jones.

"Purification of Gas from Kansas Coals," by B. E. Chollar.

"Conduct of the Electric Light Business in Connection with the Gas Industry," by W. H. Pearson.

"Advantages of Supplying a Mixture of Coal and Water Gas," by T G. Lansden.

"Some Thoughts on Fuel Gas, Induced from Practical Experience in the Distribution of Natural Gas," by John Young.

No particular effort has been made to add to the number of papers during the last month, as it is thought that to thoroughly digest these dissertations will take up all the time of the meeting. I have the following conundrums for the Question-Box:

"Is it wise to make a special discount on gas used for cooking and heating?"

"Is the scheme of introducing air into gas for the purpose of reviving the iron a success?"

"What progress has been made this year in the matter of regenerative furnaces?"

If the members have any other questions for the box I would suggest that they be sent along as promptly as possible.

It is expected that the proper disposal of this programme in the allotted two days will be just sufficient tax on the energies of the members to make the relaxation of Thursday evening and Friday all the more enjoyable.

On the evening mentioned—the second of the meeting—the Association will be tendered a dinner by the Messrs. Bartlett, Hayward & Co. On Friday the Association will enjoy a sail down the beautiful bay, stopping at points of interest, and during the trip the members will be the guests of the Maryland Meter and Manufacturing Company. An inspection will also be made of the Chesapeake gas works, when we will be in the hands of the officers of the Consolidated Gas Company.

To the foregoing it is hardly necessary to add that the Baltimore meeting bids fair to be a profitable and enjoyable one. Each member should make strenuous effort to be present at the meeting.

I am now endeavoring to secure reduced railroad rates for the members attending the convention; a special circular on this subject will be issued to the members in a very few days. Those who are not now members of the Association and are intending to be present at the meeting should apply to the Secretary for a copy of the Transportation Circular. Yours truly, C. J. R. Humphreys, Sec'y.

BRIEFLY TOLD.

The Day Use of Gas.—There can be no doubt about it whatever that gas fuel, especially for use in culinary operations, has found great favor in this city during the spring and summer seasons just ended, and in fact we are really surprised at the showing made, since no particular effort was made by the local gas companies this year to impress upon the public the advantages and value of gas as a kitchen fuel. A year or two ago such an attempt, in the shape of a series of lectures (illustrated by practical experiments) by Miss Corson, was carried out in good style, and resulted in the making of many converts. Hence, perhaps, the demand for gas cookers this summer is largely traceable to the Corson tuition of the past; for as the average housewife is a pronounced conservative, it may have taken her a year or two to become convinced of the virtues of gaseous fuel—and is now only convinced because some of her more progressive mates have tried it for a year or two. However, no matter when or where convinced, the fact remains that the New York housekeeper has largely availed herself this summer of gas in her kitchen, and with the result that the proportion of day output to total output of at least two of our local gas companies is gratifyingly large. We have the figures in one case, but are prevented from publishing them, because, as is alleged, "it would only draw too much attention to what we are doing"—the "we" meaning the gas company. What harm the printing of such in the most prominent manner possible could do we fail to note. On the contrary, our opinion is that nothing but good could result therefrom; and to go back a step for proof, we are inclined to offer the secrecy of, say, 15 years ago, as one of the reasons why the gas companies of the metropolis are looked upon with disfavor, if not suspicion. In any event, it is satisfactory to know that the use of gas for cooking is increasing on a large scale in this city, and that such use in all likelihood will soon be a potent factor in leading the companies to make a voluntary concession in their charges for gas so supplied.

No Secrecy about it in London.—On the other side of the water the huge gas companies, and the small ones as well, make no secret of their records, whether these be in line with advance or retardation. For instance, midsummer is the usual season for the presentation to the shareholders in the London gas companies of the statistics recorded of their undertakings for the first half of the year; and we have now before us the report of the Gas Light and Coke Company, and of the South Metropolitan Company. In these everything in relation to the undertakings is shown in nice detail. As a sequel to the accounts, in moving the adoption of the same, all their more prominent points are commented upon by the chairman, and the shareholders have no ground for complaint that they are "not in the know." As a sample of how carefully and minutely the accounts are analyzed, and because of their general interest as well, we make the following abstract of the remarks, made at the last half-yearly meeting of the Gas Light and Coke Company, by Chairman Colonel W. T. Makins, in moving the adoption of the statement of accounts. The Chairman said: "The £8,250 is for stoves for our stock; and as we have stated in the report—and I am happy to be able to confirm it since the report was issued—the demand for stoves is so very great that we cannot supply them fast enough for our consumers. * * * With reference to this part of our working, the question of stoves is a most remarkable feature. Gas stoves during the past half-year have increased by no less a number than 2,262, and gas engines by 60. We have not only increased the number of stoves on hire, but we have got rid of a great many. We have sold them for cash, or transferred them from hire to purchase. We have sold 1,344 stoves in the half-year. Every stove that we sell is a guarantee that the increase of gas for fuel purposes is going on, and the increase has been most remarkable. One or two figures have been laid before me, which, I think, deserve attention. The net monthly increase in the stoves on hire in July, 1887, was 57; in July, 1888, it was 45—a decrease; but in July, 1889, it was 768: so that the business is advancing, as was once classically remarked, by 'leaps and bounds.' In reference to this question, of course, our increase of business is most satisfactory; and, so far as we can judge, it has not been at all adversely influenced by the increase in electric lighting which has no doubt taken place. The number of users of electric light in our district has gone on from 508 to 581; and there is, of course, rather more than a proportionate increase in the number of lights used. After all, however, that is a mere bagatelle; and whether the increase is large or small, it has had no prejudicial effect on the existing business, and very little upon the increase of our business. * * * There is another matter referred to in the report—that is the testing question. We still continue to hold the opinion that the candles which are used are an obsolete and inconvenient mode of testing: and we are quite prepared, and have been for some time, to consider with the local authority some better method. But, unfortunately, the local authority (the County Council of London) seem to be wedded to one particular method; that is, testing by the portable photometer. The objection to this method from our point of view is this: In the first place, photometry is a very delicate science, and a photometer is a delicate instrument, and it is perfectly impossible that anything like reliable or fair tests can be taken by a wheelbarrow machine at the dead end of a main, in a high wind perhaps, and without our own inspector being present to watch the test. We are entitled by our acts of Parliament to be present whenever the tests are taken. This would be utterly impossible in the case of the portable photometer; and much as I have to regret having to postpone a settlement of the matter, I am sure that we could not assent to legislation which would impose on us the testing of our gas by these means." There is much more of interest in the Chairman's remarks, but sufficient has been given to show that secrecy takes no part in the play of the business meetings of the London gas companies.

The proprietors of the Pottstown (Pa.) Gas Company have authorized the United Gas Improvement Company to construct for them a Lowe plant the per diem capacity of which is rated to about 100,000 cubic feet. It is presumed that the apparatus will be installed by November first.

It is said that the electric annex to the Alexandria (Va.) gas works will be completed by the 15th inst.

The City Council of Norfolk, Va., has arranged for the public lighting of the city by electricity. The contract has been divided between the City Gas Light Company and the Virginia Electric Light Company. Under the agreement the first named will furnish 80 arcs, while the latter will furnish 82. The rate is $90 per lamp per annum, the system is the Thomson-Houston, and the contract is to run for one year from November 1st.

Some Interesting Figures.—At the close of last year, we learn from one of our foreign exchanges, there existed in the city of Munich alone about 116 electric light installations, numbering 588 arc lamps and 23,231 incandescent lamps. The Theater Royal, in the same city, alone employed 4,900 of these lamps. Allowing for each arc lamp a mean intensity of 900 candle power, and for each incandescent lamp an intensity of 16 candle power, we have here a total of 900,896 candle power. Turning now to the motive power spent in operating these lights, we find that 256 arc lamps and 6,687 incandescent lamps are produced by "Otto" gas engines; 233 arc lamps and 14,610 incandescent lamps are produced by steam engines; and 90 arc lamps and 1,934 incandescent lamps are operated by turbines. The total number of candles represented by these lamps can thus be divided up with special reference to the power used:

	Arc.	Incandescent.	Total.
Gas engines.....	230,000	106,992	337,392
Steam engines.....	209,700	233,760	443,460
Turbines	89,100	30,944	120,044

By way of comparison it should be stated that at the close of the year 1885 the total intensity of electric lights in use in the city of Munich did not exceed 160,020 candle power. These facts are worthy the attention of our American gas companies.

Energy Relations of Gas and Electric Lighting.*

By President Henry Morton, Ph. D.

During the last ten years most of the brightest minds among inventors have been occupied with the problems of the production of light from electricity, and an immense progress has been made in the way of improvement in that department, and relatively little attention has been given to the development of light by direct combustion; and yet, if we compare the latest and best developments in each direction (*i. e.*, the best incandescent lamp and the best gas burner), as to the matter of economical conversion of the latent energy of fuel into the active energy of light, we shall find that the relatively simple, crude and unimproved method of the gas burner is still leading in the line of economy. In both cases the losses are enormous, and the possibilities of improvement are immense, and it will, therefore, be of value to see just how these losses are distributed and where they are located in each case.

In the first place let us see what is the "mechanical equivalent" of light.

In 1865 Prof. Julius Thomsen, of Copenhagen, showed that the "mechanical equivalent" of light was about 12.28 foot-pounds per minute, or 749 foot-pounds per hour for each candle. (*See Philosophical Magazine*, 1865, Vol. 30, p. 246.)

Mr. Moses G. Farmer, in a paper in the *American Journal of Science and Arts* (1866, Vol. 41, p. 214), showed as the result of certain experiments made in Boston with an electric light, that the "mechanical equivalent" of light was about 10.1 foot pounds per minute for each candle. This would give us an average of 11.29 foot-pounds per candle, or, for the sake of round numbers, say, 12 foot-pounds per candle per minute.

If a candle power per minute represents 12 foot-pounds, a candle power for an hour would be equal to 720 foot-pounds in the same time.

This being the "mechanical equivalent" of light, however produced, let us next find out what proportion of the total "mechanical equivalent" latent in a cubic foot of ordinary illuminating gas is converted into light by burning in a standard gas burner.

A cubic foot of our Hoboken gas gives about 640 heat units. That is to say, a cubic foot of it, in burning, would raise the temperature of 640 pounds of water 1° F. This multiplied by Joule's equivalent of 772 gives 493,080 foot-pounds, or, say, in round numbers, 500,000. That means that a cubic foot of this gas, in burning, gives out half a million foot-pounds of energy.

Now let us see how this compares with the amount of energy developed in the form of light by the same cubic foot of gas. This same Hoboken gas, burning in a standard Sugg burner, so as to make it give 16 candles, will consume at the rate of just exactly 4 cubic feet per hour. That gives an efficiency of four candles per cubic foot. Each cubic foot will, therefore, give us 4-candle power for an hour. Therefore each cubic foot so burned would, in an hour, give out light equal to 12 (the energy of 1 candle light per minute) multiplied by 4 (because there would be 4 candles) multiplied by 60 (the number of minutes), which is equal to 2,880 foot-pounds, and this is the total energy of the light developed. While it is doing this, or is giving out the 2,880 foot-pounds of light energy, it is at the same time giving out the half million foot pounds as the total energy of combustion. The percentage of light energy to total energy would then be 0.586 per cent., or, in round numbers, 0.6 per cent.

So we may say that with the ordinary Sugg burner, giving 16 candles while burning 4 cubic feet per hour, we are getting a light efficiency of 0.6 of one per cent. of the energy present in the gas burned.

This shows us that in this Sugg burner we are turning the available total energy into a particular kind of energy (*i. e.*, light energy) by a method which is enormously wasteful; and that, therefore, there is every probability that some change in the method or some new invention will improve this conversion to an equally great degree. And if it only economizes a little, if it gives us even but 1 per cent. instead of 0.6 of 1 per cent., it will be giving us an enormous advantage at once.

This, and more than this, is, however, accomplished by the Welsbach burner, which has been so often described that I need only here name it, and say that tests, made in our own photometer, with this same Hoboken illuminating gas, show an efficiency of from 9 to 12 candles per cubic foot, under different conditions or with different burners.

Taking 10 candles per cubic foot as a conservative average, we should have 12 (the energy in foot-pounds per candle per minute) × 10 (the number of candles per cubic foot) × 60 (the time in minutes it would burn) = 7,200 foot pounds. This would be 1.4 per cent. of the 500,000 foot-pounds of total energy which we have seen that a cubic foot of Hoboken gas contains.

* Reprinted by request.

Both of these figures, the 0.6 per cent. for the ordinary burner, and the 1.4 per cent. for the Welsbach, seem very low, and certainly indicate a vast possibility of improvement in this method of transforming the latent energy of fuel into light.

Let us now turn to the incandescent electric lamp and see how it stands in its relations of economy when *its* light is compared with the energy expended in producing it.

In the case of the incandescent electric light we find the following figures. Assume that practically we can get 10 lamps of 16 candles each for each horse power expended. This figure will make, for each horse power, 160 candles. Now, at 12 foot-pounds of energy per candle per minute, in the form of light, this would give us 1,920 foot-pounds of energy per minute, in the form of light, from these incandescent lamps. A horse power expresses 33,000 foot-pounds per minute. Comparing those numbers we get 5.812 per cent. of the total energy developed as light, instead of 0.576 per cent., in the case of the gas burner.

In other words, in the electric lamp we have about ten times as much of the total energy usefully converted into light as in the ordinary gas burner.

With the Welsbach burner the relation is not so much in favor of the electric lamp, being as 5.812 to 1.4, or about four times as much of the total energy, applied to the dynamo machine, converted into light, as of energy in the gas so converted in the Welsbach burner.

If, however, we go back to the coal as the source of the energy, then we are confronted at once with this other condition.

In the steam engines used for running electric light plants (and this is the result, not of mere guess, but of a number of measurements which have been made at the Stevens Institute by various members of its Faculty, on electric light plants), we utilize only about 5 per cent. of the energy of the coal used to produce the power applied to develop the electric current. It is true that there are engines that give 10 per cent., and perhaps there are some that give a little more—I think that 10 per cent. is very high, and is not practically reached at all in any such conditions as exist in engines running electric light plants—and I think that 5 per cent. is about as much as we can depend upon. On the other hand, in gas making I think it is fair to say that there is not any greater waste in the production of gas from coal than 50 per cent., and, therefore, you get into the gas 50 per cent. of the energy of the coal.

From this you will see that there is here the same ratio (one to 10) between gas and electricity, only it is turned the other way. In order to turn the coal energy into motion (as in using the steam engine to drive an electric light plant) we throw away 95 per cent. and only utilize 5 per cent.; in order to turn coal into gas we throw away 50 per cent. and utilize the other 50 per cent. So that, getting 5 per cent. in the one case and 50 in the other, the proportion is as one to ten; and that brings the two systems to an equality again; for, starting with the coal, about as much of the total energy of the fuel is developed by the ordinary gas burner as by the electric lamp. Thus, starting with the coal pile, and considering merely the question of the conversion of coal into light, one process is about as wasteful as the other, at present. I think this is a very encouraging thing to the gas makers. It shows us that, notwithstanding all the advantages that electricity has had, by reason of its attracting the attention of the most ingenious minds of the world, and with all the ingenuity, thought and effort which have been devoted to it, the conditions are still so nearly equal in respect to developing energy from its crude source—the coal. I think it shows that if even a moderate amount of the same genius and effort were turned in the direction of developing light from gas, and in improving the agencies which affect this conversion, we might hope for something very good indeed.

I am aware that some who are connected with the electric lighting interest say that they do much better than what I have stated, but I have taken the trouble to inquire what any company believes any other company can do, and I find that they would all much rather guarantee an efficiency of 4 Watts per candle than anything better—if they knew that the guarantee was going to be enforced. In another comparison which I have made I have, therefore, taken 4 Watts per candle because I find that to be the result of many tests. The Franklin Institute tests, made a few years ago, showed nearer 5 than 4 Watts for Mr. Edison's lamps. Suppose that we take 4 Watts as being not an unfair estimate of the practical efficiency of incandescent electric lamps on the average. There being 746 Watts to the electric horse power, this gives 186 candles to the horse power; and each candle representing 12 foot-pounds, we have 186 × 12 = 2,232 foot-pounds of light energy to the horse power; and 2,232 ÷ 33,000 gives us 6.7 per cent. as the efficiency of the electric lamp on this basis; which is not far from the 6 per cent. which we have already calculated from other data.

There is another point that it is important to notice. I have pointed

out the advantages and the possibilities of the future with reference to the development of gas lighting, but I want also to draw attention to some very important steps which have been made in electric lighting.

It will be remembered that when the subject first came up there were one or two serious drawbacks to the introduction of the electric light. One was the enormous cost of distribution. The cost of laying pipes and keeping them in order was bad enough in the distribution of gas, but much worse in the case of electricity, when they have to lay what we may consider copper pipes, and incur other enormous expenses in that direction, especially for the incandescent system.

We are all familiar with the secondary system and its advantages, but I want to draw attention to what is no doubt already known in a general way—the very considerable advances that are being made in that direction.

The use of secondary currents supplied by converters or tran formers, enables us to use smaller wires in distributing, and then bring down the current to the requisite quantity and low pressure or electromotive force just where we want to use it.

Another obstacle in the way of introducing the electric light existed in the fact that, until some satisfactory method of measuring the electric current was discovered, there would be serious difficulty in making its use a commercial success. We all know what difficulty there was in introducing gas before the companies got to measuring it, when gas was sold at so much per light, and the consumers knew that they might burn an excessive amount without having to pay extra for it. The same difficulty has existed with regard to the electric light. The lamps have been put in and a contract price agreed upon, upon the assumption that they were to be used only for a certain number of hours per day; and then they have been used two or three times as long. It has been a very difficult matter to control. It is only very recently that this requirement has been, as it seems to me, very satisfactorily met.

This has been accomplished by two forms of electric meter, the Westinghouse meter, invented by Mr. O. B. Shallenberger, of Pittsburgh, and the autographic recording meter, devised by Professors Geyer and Bristol, of the Stevens Institute.

The particular lesson taught by the above considerations is, I think, that there is an immense field to be cultivated, with prospect of profit, in the development of light from fuel by the method of making and burning gas; and that it behooves those interested in the manufacture of gas, and indeed the public generally, to aid in the cultivation of this field.

Without such cultivation, notwithstanding its present advantages, gas as an illuminant cannot hold its present position.

The mere cheapening of gas, I contend, is not the only or the scientific method of correcting the manifest wastefulness of our present method of using it to produce light. It would be equivalent to saying that to secure cheap fuel was the right way to improve the steam engine. In the case of gas such a policy, if persisted in, can only result in relegating gas to the cellar, the kitchen, and the engine room, to warm us, to cook our food and drive our machinery, and in replacing it, as a means of illumination, by electricity which may, it is true, owe its very existence and life to the enslaved labors of its deposed rival, imprisoned in the furnace of the steam engine, or laboring blindly in the closed cylinders of the gas engine.

I believe that gas, much as it has been abused, deserves a better fate, and will secure it, if anything like the attention is given to its education and refinement as an illuminating agency which has been lavished upon its impalpable rival—electricity.

I believe that a good beginning, at least, has been made in this direction by Dr. Auer von Welsbach and those who have been developing and improving his very original invention, and that from the fertile brains and skillful hands of the many Stevens graduates who are en gaged in one way or another in the companies who have in hand the accomplishment of this result, there will come constant improvements of a practical and efficient character.

Production of Cyanides from Ammonia.

Mr. A. A. Breneman, Editor of the *Journal of the American Chemical Society*, has published a very concise historical summary of the progress and development of processes for the manufacture of cyanogen and its derivatives, from which we abstract his remarks respecting the production of cyanides from ammonia. The author says:

The reactions by which ammonia is converted into cyanides are so closely related to the direct production of cyanides from nitrogen, and offer so many points of suggestion in connection with the same, regarded as an industrial problem, that the history of them cannot be omitted from this summary.

The original experiment, ascribed by Langlois to Scheele, of heating together sal ammoniac, potash, and charcoal and obtaining potassium cyanide may be regarded as the starting point.

Liebig attributes to Scheele (1750–80?) the statement that ammonia passed over hot charcoal yields hydrocyanic acid, but Langlois does not find this in Scheele's writings. What Scheele does say is that when sal ammoniac is heated with vegetable charcoal and potash the mass yielded on lixiviation "*la lessive du sang*"—yellow prussiate of potash.

Clouet, in 1791, mentioned that ammonia gas passed over hot charcoal yields hydrocyanic acid. He states that Thenard had noticed that a soluble substance having the odor of bitter almonds was formed under the same conditions. Bonjour, Vauquelin, Buchholz, Schroder, and Ittner all refer to the same fact as based upon experiments in which ammonia or ammonium chloride was heated with charcoal or with mixtures of charcoal and lime or oxide of lead. The product was probably ammonium cyanide, as in later repetitions of similar experiments; but the constitution of the cyanides was not then understood, as this was before the date of Gay Lussac's discovery (1814). Clouet reported that hydrocarbons, carbonic acid and nitrogen were set free at the same time, while Bonjour showed that hydrogen was the only bye product—an observation that was fully confirmed by Langlois in 1841. Trommsdorf, however, was first to recognize ammonium cyanide in the products of this experiment.

Kuhlmann found that volatile nitrogen compounds containing all hydrogen or mixed with volatile hydrocarbons, when passed together with carbonic oxide over hot platinum sponge, yielded ammonia. He refers to Clouet's experiment, and shows, by a repetition of the same, that no hydrocyanic acid, but only ammonium cyanide, is produced. Marsh gas is separated at the same time. He regards the process of preparing alkaline cyanides as involving first the formation of ammonia, which, in presence of alkali and excess of carbon, is converted into cyanogen and carbonic oxide. Langlois repeated Scheele's experiment with sal ammoniac, but obtained no cyanide. He also obtained ammonium cyanide by passing ammonia over hot charcoal, and called attention to the remarkable way in which ammonium cyanide resists decomposition at high temperatures. Graeger passed vapor of ammonium carbonate through alkaline charcoal contained in narrow iron cylinders 1½ inches in diameter, and obtained 93 to 95 per cent. of the theoretical yield of ferrocyanide. When large and wide cylinders were used the results were much inferior, only 15 to 30 per cent. being obtained.

Brunquill, in 1856, proposed to apply the same principle to the production of cyanides and prussiates. Ammonia, or the vapor from distillation of bones, etc., is passed over hot firebrick, and then over hot wood charcoal in pieces of the size of a chestnut. The volatile ammonium cyanide is absorbed by solution of ferrous sulphate in an apparatus of peculiar construction. A portion of the ammonia is recovered as sulphate, and used anew in the process. The precipitated cyanides of iron are converted by potash or soda into prussiates. The advantages of this method are the prevention of waste of potash and of nitrogen. Only moderate temperatures being employed, there is no loss of potash by volatilization, by absorption, or by formation of unavailable salts of potash, all of which occur in the old process. The cost of the ammonia is defrayed by the increased value of the residue when bones are used. The author hoped also to obtain ammonia for the first stage of the process by passing air and steam over coal.

Levoir, in 1859, noticed that a flame of ammoniacal gas yielded cyanogen (ammonium cyanide) in burning. Fischer questioned this statement, saying that he had repeated Levoir's experiment with an argand burner, and obtained no cyanogen. The fact was verified, however, a few years later by Romily.

H. Johnson, in 1860, obtained in England a patent for a method, devised by J. V. Lucas, in Paris, for preparation of prussiates, which consists simply in saturating wood charcoal with potash solution, drying and heating it to redness in a retort, and passing ammonia over it. The charcoal is mixed also with 5 per cent. of iron filings.

J. Webster, in 1860, patented in England a process for the manufacture of prussiates by charring or burning a mixture of sawdust or spent bark and oxide of iron, charging the mixture with potash and passing ammonia through it.

Fleck, in 1863, proposed to make cyanides as follows: A hot mixture of charcoal or coal, sulphur, and potash is treated with a definite quantity of ammonium sulphate. Potassium sulphocyanate is formed. Ammonia in part escapes, but is absorbed and utilized. The sulphocyanate is decomposed by metallic iron, yielding potassium cyanide and ferrous sulphide. It was claimed by the author that 94.42 per cent. of the ammo-

nium salts used were ultimately converted into cyanides. This process is referred to by Meyer ten years later (1874) as not being successful in practice.

Gelis, in 1862, manufactured prussiates in Paris after a new method of his own invention, for which a medal was awarded at the London Exhibition of 1862. It consists in mixing, in the cold, a solution of ammonium sulphhydrate, obtained from gas liquor, with carbon disulphide; ammonium sulphocarbonate is formed, and sulphureted hydrogen. The addition of potassium sulphide to the sulphocarbonate results in the production of potassium sulphocyanate, which by action of iron can be converted into cyanide or prussiate. The bye-products—ammonium sulphate and sulphureted hydrogen—are again used. The process is carried on in a retort, and these products are readily recovered. The cost by this process was said by Payen to be within 1.6 francs per kilo (about 15 cents per pound) for potassium ferrocyanide. Meyer, in 1874, remarks that the conversion of potassium sulphocyanate into cyanide by iron is wasteful of nitrogen when fusion is resorted to, and incomplete in the cold. The process of Gelis was finally abandoned.

Romily, in 1867, repeated the experiment of Levoir, and improved upon it. Illuminating gas was made to bubble through ammonia and then burned through a jet, and the flame was made to impinge upon a surface of water containing caustic potash in solution. Potassium cyanide was found after a time in the solution. Solutions of sodium and calcium hydrates gave corresponding results. When distilled water was used ammonium cyanide was found in the liquid. The effect was produced only when the flame was luminous or smoky; the flame of a Bunsen lamp yielded no cyanides. Vapors of oils or hydrocarbon gases containing ammonia gave similar results. Vapors of water in the mixture of gases did not prevent the formation of cyanides. When iron in fine powder was suspended in the alkaline solution ferrocyanide was formed.

An apparatus was devised to apply the principle industrially. A cylinder of iron revolving on a horizontal axis, dipped into a tank containing an alkaline solution. A pipe, parallel with the cylinder and pierced with holes, supplied ammoniacal illuminating gas, burning in a line of jets which impinged upon the face of the cylinder. The cyanides were absorbed by the film of alkaline liquid which was continually renewed as the cylinder revolved.

Schwarz, in 1869, obtained ammonium cyanide by passing vapor of carbon disulphide mixed with ammonia over hot iron or copper in an iron tube. Sulphide of the metal is simultaneously formed. The vapors are passed into a mixture of solutions of caustic potash, ferrous sulphate and ferric chloride and the resulting mass is converted into Prussian blue by hydrochloric acid, and then by potash into yellow prussiate. Schwarz also confirmed the conclusions of Levoir and Romily as to the production of ammonium cyanide during the combustion of ammoniacal illuminating gas, and he suggests that the purification of such gas from ammonia is, on this account, a matter of the greatest importance.

Frohde remarks that the fumes from burning coal may be noxious, not merely because of oxides of carbon in them, but also because of cyanogen. He claims to have detected cyanogen by its odor where coal was incompletely burned.

E. Meyer, in 1874, published a review of the cyanogen industry up to the year of the Vienna Exhibition (1873). He found the old method still the only important one. The problem of making cyanides from nitrogen of the air was still unsolved, and the earlier efforts of Possoz and Boissiere had not been even equalled in its results by the later one of Margueritte and Sourdeval, from which much was at first expected. The methods of using ammonia as a source of nitrogen for the manufacture of cyanides had not replaced the old method, through dry distillation of animal matters (Karmrodt and others)—which are treated by fusion in the old process—nor by substitution of ammonia salts as a source of nitrogen for these substances (Fleck). Neither had the methods based upon formation of sulphocyanate (Gelis) marked any great success. The production of sulphocyanate is readily brought about by Gelis' method, and the process is, so far, a success; but the conversion of this salt into cyanide or ferrocyanide is difficult. It does not stand sufficiently above the usual raw materials (animal matters) used for this purpose, in its proportion of nitrogen, to counterbalance the disadvantage which it offers in comparison with them from its high proportion of sulphur.

F. Maxwell-Lyte patented, in 1875, a process for manufacture of ammonia by bringing nitrogen in contact with nascent hydrogen liberated in the presence of a triad or pentad element.

Tscherniak and Gunsberg, in 1878, patented a method in Germany for the manufacture of cyanides similar in principle to that of Schwarz. Two parts of ammonia water of 85 per cent., and one of carbon disulphide are put into a tight vessel, heated to 110° C. below and cooled above so that a continuous distillation of the volatile substances occurs. After three or four hours the mixture is found to be converted into ammonium sulphocyanate and sulphureted hydrogen. The ammonium salt is converted into calcium sulphocyanate, which, by action of an alkaline sulphate or carbonate, yields the corresponding alkaline salt, and this, by heating with coal, lime and iron, yields cyanides or prussiates. The ammonia is recovered and used again.

Graham Young, in a process for the manufacture of ammonia patented in England in 1880, has suggested the use of electricity to effect the union of nitrogen and hydrogen. The principle had also been mentioned in an English patent issued to Chisholm and Kent, in 1860. No practical result has as yet come from these suggestions.

The Loomis Gas Process.

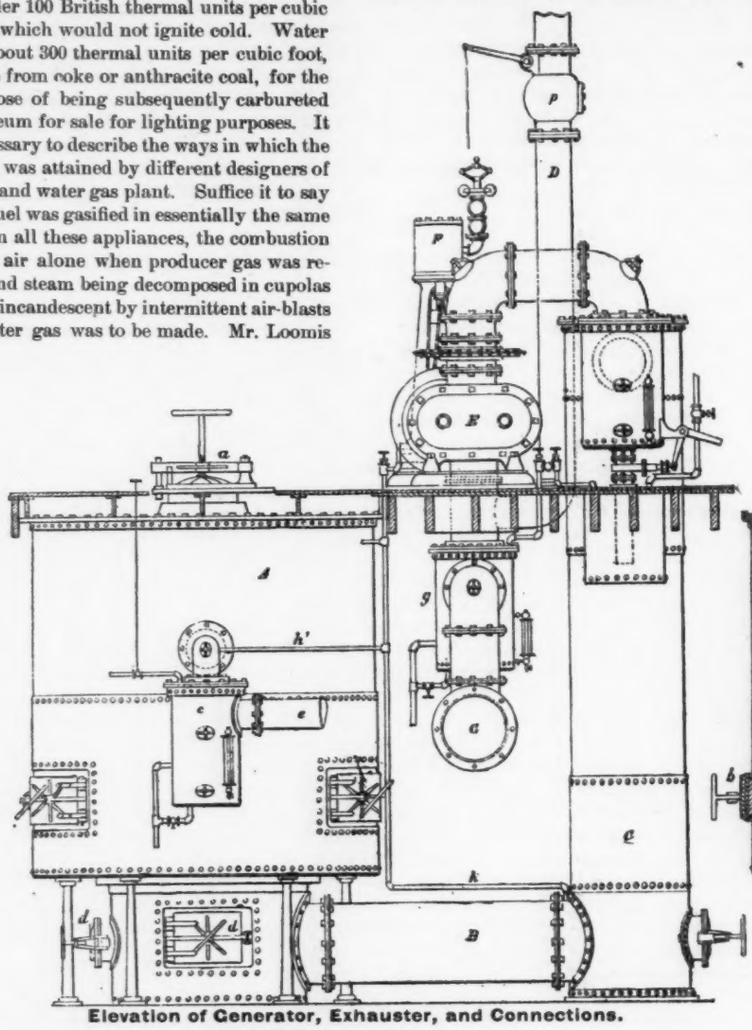
The London *Journal*, in its issue for Aug. 6, in describing this process, says:

Among the multitudinous water gas processes that have been brought to practical perfection in the United States, that which bears the name of the inventor, Mr. Burdett Loomis, of Hartford, Conn., is certainly one of the most remarkable. It is some time since we first had occasion to notice this particular system, respecting which it was only very recently that trustworthy information has transpired. The references to Mr. Loomis and his proceedings that have appeared in some of the American technical periodicals have been anything but complimentary, and would lead a hasty reader to imagine that Mr. Loomis is one of the self-styled heaven-sent geniuses, of the Keeley type, of which America has no reason to be proud. This reputation has been forced upon Mr. Loomis by his critics in the press, simply because he was known to be attempting to do what it did not suit any particular coterie in the American gas interest to concede as practicable—namely, to make producer or water gas in a cupola, out of cheap bituminous coal slack. By so doing he offended the traditions of the coal gas people, who held that the only possible way of making gas from bituminous coal is in a closed retort; and he even more grievously "trod on the toes" of the water gas men, who could not work without anthracite coal, and were fast friends of the Standard Oil Company. The very fact of Mr. Loomis having devoted himself to making water gas out of bituminous coal was, however, a particular reason why we should keep an attentive eye upon him; and it is with peculiar pleasure that we herewith present our readers with the first authoritative description, with illustrations, of the perfected Loomis apparatus, the English agency for which has been taken up by the well-known and respected firm of Messrs. Newton, Chambers & Co., of Thorncliffe, Sheffield. When this account has been read and duly considered, it will be easy to decide whether or not the inventor is justified in his claims.

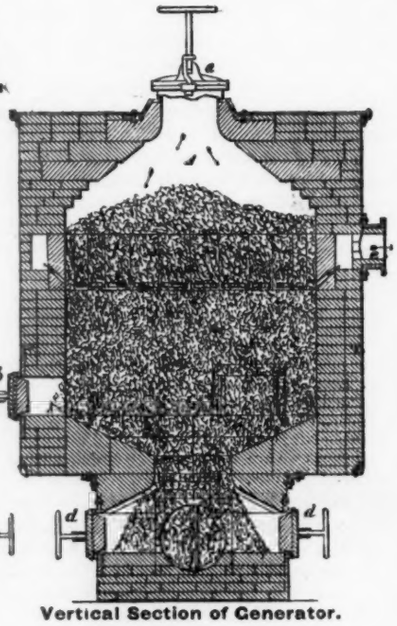
In the first place, however, we must crave patience while we refer to the condition of the water gas question as it existed before Mr. Loomis was able to cast aside the reserve which he has maintained regarding the nature of his process and the character of its results. This reserve, although natural enough, and prudent in the circumstances, has undoubtedly done Mr. Loomis some injury, not only in permitting him to be ridiculed by interested rivals, but also in allowing misleading and exaggerated reports of his doings to be made public by well-meaning but injudicious friends. All this is now at an end. The particulars we are now about to publish have been supplied by Mr. Loomis himself, who is now relieved of all fear of the Patent Office; and they will be justified on the contrary by the apparatus he is now erecting at the works of Messrs. Firth & Sons, Limited, of Sheffield, the performance of which will make or mar him in this country. Writing as to the production of fuel gas in the *Journal* for May 28 last, we said that what was wanted in this connection was some such process as the following: "The slack, however wet, dirty, dusty, sulphurous, or stony, should be tipped into the hoppers of the gas-making cupolas, and gasification should go on continuously and completely, so that nothing but gas and ashes should remain of the material put into the apparatus." This is precisely what Mr. Loomis claims to have effected by means of the apparatus illustrated herewith; and the claim is now in the right hands for authoritative trial. If Messrs. Newton, Chambers & Co., and Messrs. Firth & Sons, Limited, are satisfied with the proof upon their own premises of a process which we may be sure they have not adopted without good *prima facie* evidence of its quality, the unattained ideal of May must be regarded as the event of the succeeding August. We refer to our May article in order to compare its whole tenor with the impression that must be caused by this present statement respecting the Loomis plant, of which, at the time when those remarks were written, only the dimmest notion had reached the public.

When Mr. Loomis began his experiments, some years ago, the manufacture of producer gas, by the ordinary cupola, was a commonplace of American *technique*. Producer gas was made at factories by the well-known Siemens plant, which yielded gas of a calorific power of something under 100 British thermal units per cubic foot, and which would not ignite cold. Water gas, of about 300 thermal units per cubic foot, was made from coke or anthracite coal, for the sole purpose of being subsequently carbureted by petroleum for sale for lighting purposes. It is unnecessary to describe the ways in which the same end was attained by different designers of producer and water gas plant. Suffice it to say that the fuel was gasified in essentially the same manner in all these appliances, the combustion being in air alone when producer gas was required, and steam being decomposed in cupolas rendered incandescent by intermittent air-blasts when water gas was to be made. Mr. Loomis attempted to make his material into combustible gas which should be inflammable when cold, and therefore constitute a distributable fuel in the sense that producer gas is not; and to utilize for this purpose the fuel gas rejected by the water gas manufacturers, while avoiding the waste inherent in their intermittent "blowing up." He was told it could not be done. He persevered; and to-day he claims to have done it.

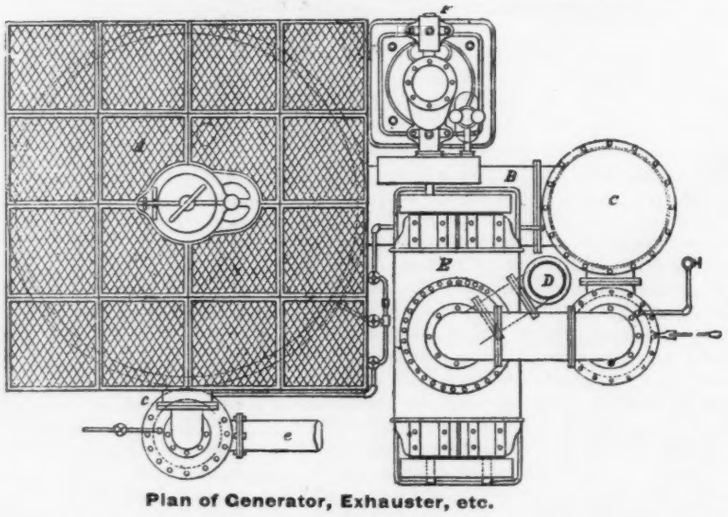
The first difficulty, of course, in connection with the gasification of bituminous coal, whether large or small, in a cupola, is that of caking over. The fuel fuses together into an impermeable dome, and the gas making comes to a stop. Mr. Loomis aimed at overcoming this difficulty by making the cupola burn with a down-draught instead of an up-draught. This is obvious enough; but the difficulty that then arises is to make the fuel burn fast enough, and to avoid clinkering in the bottom of the producer. Mr. Loomis speedily found that no chimney draught will serve to make a down-draught fire burn quickly; but when he tried a forced draught by means of a blower his troubles became worse than ever. The contents of the cupola would fuse into a mass that would not move from its place, while the fire would burn hollow underneath, and only blowholes could be driven through the caked mass. Then at uncertain intervals the blast would have to be stopped, the cover of the producer lifted off, and bars and sledges put to work to break up the conglomerate formation. After years of effort and disappointment, Mr. Loomis, never doubting that the principle of the



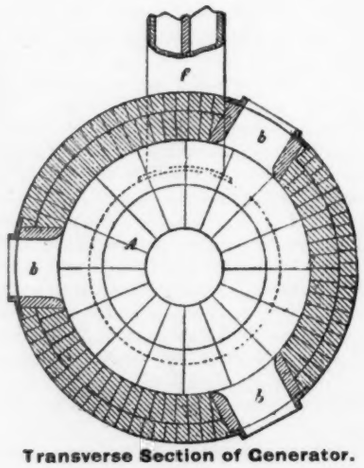
Elevation of Generator, Exhauster, and Connections.



Vertical Section of Generator.



Plan of Generator, Exhauster, etc.



Transverse Section of Generator.

down draught generator was the right one for his purpose, developed the arrangement now illustrated, in which an exhauster is used *to draw the air down through the generator*—thus getting rid of the closed top necessary when the blower was used, and which prevented the stoker from seeing what he was doing. By this device it is stated that the generator may be kept going, with the worst kind of slack, for any length of time, without any trouble from caking over. It is reported that, as a matter of fact, a Loomis exhaust generator has been kept alight for two years without stopping to clean out or repair.

After this preliminary statement the description of the drawings will be easily understood. These represent a complete plant in section, elevation, and plan. The generator *A* does not differ essentially from any other structures of its order. It is built of fire blocks or bricks in an iron casing. The fuel is charged through the door *a*, which in larger plants is connected with a hopper contrived for automatic feeding in large or small quantities at a time. The precaution is observed of keeping the generator full of fuel above the level of the openings into the exit channel *e* for water gas, which encircles the generator and is controlled by the seal *c*. The openings *b*, of which there are three at equal distances on the plan, are for stirring up the contents of the generators at the point where the ashes might be expected to become troublesome, if anywhere; and *d* are the clinker or ash doors. Of hard clinker there is really none, as the system of working will tend to show. The pipe *f* is for the producer gas, the course of which may be followed through the regenerative superheater *B*, through the cooler *C*, which is really a steam boiler, and then to the exhauster *E*, shown with its motor engine *F*. Thence the gas passes on through the gas main *G* to the furnaces, etc., for which it may be required, being in its passage washed for the recovery of ammonia, where this economy is desired. There is a waste pipe *D*, controlled by a valve *p*, which is opened to blow off the worthless gas when the fire in the generator is being lit up, or to let any bad gas escape that may have been made by an accidental mismanagement of the generator, such as letting the heat down, etc. The gas main *G* is controlled by the seal or valve *g*. The boiler *C* not only supplies steam generated by heat of the freshly-made producer gas for driving the exhausting engine, but also through the steam pipes *h* and h^1, for the manufacture of water gas in the generator. The principal pipe is *h*, which introduces steam to the lower part of the generator through the superheater *B*. This is for making water gas alternately with producer gas. The other pipe, h^1, is for running a little steam into the upper part of the producer, to mix with air when it is desired to make only producer gas continuously, with a view to the prevention of clinker.

This is the whole of the apparatus, and nobody who sees how simple it is will doubt that Mr. Loomis must have taken great trouble in making it so. The process of working depends upon the nature of the product desired. With the same apparatus can be made (1) producer gas, so superior to the common that it will ignite cold, of about 120 heat units per cubic foot; (2) water gas, giving a calorific duty of about 300 units per cubic foot; (3) a combination of producer and water gas, giving a gas of rather more than 200 units per cubic foot, and representing the whole of the capacity of the fuel in the gaseous form; (4) an illuminating coal gas of about 10 or 12-candle power, from common slack, capable either of being separately stored for use, or of being mixed with the water gas, improving its calorific value to 350 units per cubic foot, which is as rich a gas as can be burnt undiluted without smoking, and rendering it characteristically odorous. For the first process the charging door *a* is left open, and the water gas seal *c* is closed. A supply of steam is admitted through the pipe h^1. The exhaust draws the air downward, as shown by the arrows; and, owing to the regularity of the action of combustion (altogether different from an upward-draught furnace), and the bituminous nature of the fuel, the product is exceptionally good gas of the kind, without any condensable impurity—all the tar being carbonized—but with a high percentage of ammonia if a little steam is used in its production, as is always the case. When the stronger water gas is required, all that is necessary is to close the charging door, open the water gas seal, shut the producer gas valve, and turn on the steam through the superheater. Water gas immediately comes over; and the process goes on until the heat of the fuel in the generator begins to fall, which is shown by the appearance of redness, due to carbonic acid, in a test flame kept under the stoker's observation. Upon this he immediately stops the process, and resumes blowing up—or rather, in this system, exhausting down—which revives the fire, and at the same time makes more producer gas. The proportions of the two kinds of gases may be varied to suit the requirements of the user. The production of coal gas is simply by exhausting downward, *without admitting air*, immediately after throwing a charge of fresh coal upon the incandescent fuel in the generator. It then becomes a mere retort; but as soon as the evolution of gas slackens, the coke is turned into water or producer gas, as already described.

Mr. Loomis does not expect that British gas companies, working under statutory conditions, will be at liberty to adopt his process at first. Indeed, neither in the United States nor in this country has he approached gas companies, but has dealt solely with factory owners in need of cheap fuel. He appeals to them as having solved the problem of cheap smokeless fuel gas, made continuously from the worst slack, with the minimum of handling, and capable of instant modification through a considerable range in case quality is preferred to quantity, or *vice versa*. Taking into consideration the fact that a self-luminous gas can also be obtained from the same apparatus, we do not hesitate to say that the claims of Mr. Loomis far transcend those of any other fuel gas maker who has yet, so far as we are aware, appeared before the public.

The Gas Light and Coke Company vs. The South Metropolitan Gas Company.

In this English case the Gas Light and Coke Company seek to restrain the South Metropolitan Gas Company from supplying gas to the Nine Elms Station of the Southwestern Railway Company, alleging that such supply is an infringement of the Districting Act of 1860. Justice Kekewich decided in favor of the defendants, and the Court of Appeal upheld that judgment. The plaintiffs appealed to the House of Lords, and the latter recently gave judgment, reversing the finding of the lower Courts. In view of the importance of the case, we give the opinion submitted in full:

The Lord Chancellor said: This case comes before us undoubtedly under some circumstances of peculiarity, inasmuch as it is not only an appeal from the Court of First Instance, and from the Court of Appeal, but every judge before whom the question has come has expressly or impliedly expressed his own dissatisfaction with the judgment at which he was compelled to arrive. Lord Justice Fry and Lord Justice Bowen had, in plain terms, said they thought the judgment was wrong. The ground upon which these learned judges considered themselves precluded from forming an independent judgment appears to me to be that, a considerable time before, Lord Justice Cairns and Lord Justice Rolt had expressed opinions which did not permit them to form an opinion as to what the true construction of the Act of 1860 is. I have been at some pains to see whether in the facts as exhibited in that case it is possible to suppose that either of the learned lords justices put forward a proposition which it was permissible for the respondents in this present case to maintain, and I certainly have come to the conclusion that if Lord Justice Cairns and Lord Justice Rolt were at present considering this case, there is nothing in what they said which would prevent them from deciding as I think they would have been compelled to decide. It is necessary to state the particular question which was then before them, in order to understand the mode in which it became necessary for them to give any construction, or, rather, to speak more accurately, to express any opinion. Under the Districting Act the gas company in that case complained that the Great Western Railway Company was being supplied with gas by a rival company, and that the Great Western Railway Company itself had in terms entered into a contract and was about to supply the Great Western Hotel, which stood in relation to them of a tenant, with the gas in question. The question as it originally came before Vice-Chancellor Stuart was determined by a consideration of what had been the legal relations between the different parties before the passing of the Act, because, by one of the sections which was introduced for the purpose of safe-guarding arrangements that had been entered into previous to the passing of the Act, it was provided that nothing in the Act should affect such rights. The question, as it came before Vice-Chancellor Stuart, was disposed of at once by reference to the section in question, and from that decision there appears to have been an appeal on a point of form—an appeal embracing the whole question, but, as I gather from the judgments of Lords Justices Cairns and Rolt, everything was abandoned in the argument except the question of the supply by the Great Western Railway Company to the Great Western Hotel Company; and all that was said with reference to the preliminary question as to the supply by the Gas Company to the Hotel Company, or, rather, to the situation of the Great Western Railway Company, was introductory to the arrangement between the Railway Company and the Hotel Company. In that condition of things, and it being admitted that at the particular point at which the gas was supplied to the Great Western Company, whether the meter was the exact point at which the property in the gas changed or not, the meters of both parties were outside the limits of the complaining company's district, Lord Justice Cairns and Lord Justice Rolt pointed out that so far as the

supply of gas to the Great Western Railway Company was concerned, the whole transaction was complete upon the delivery of the gas to the Railway Company at that particular point where both meters were situated. Undoubtedly in that case, and with reference to the facts of that case, Lord Cairns did make the transaction analogous to the question of sale and delivery at that point; and it is to be observed that what his Lordship seemed to argue upon was that the moment the gas had been received through the meter at a particular point, the Railway Company took upon themselves, in the ordinary course of the management of their railway, the whole conduct and management and disposal of the gas. They altered the lights; they took the pipes where they pleased, and from time to time they altered the destination of the various quantities of gas they received; and as a result, the learned judge pointed out that in that case, and as applicable to the facts of that particular case, a quantity of gas was given to them to do what they pleased with at a particular point, and that having got it they then disposed of it as they pleased, and he observed that that part of the question was no longer before the court, because the question of the supply of the Great Western Railway Company was disposed of by the abandonment in the arguments of the question as to whether that was an invasion of the peculiar property of the rival gas company. Then their lordships proceeded to dispose of the case before them, and the question then arose with reference to the supply by the Great Western Railway Company to the Great Western Hotel. In the first place, it was pointed out that, by a contract long antecedent to the passing of the Act of 1860, and protected, therefore, by the 54th section of the Act, these arrangements have been entered into by the Great Western Railway Company, and that the Railway Company was absolutely protected in its receipt of the gas by that section. But Lord Cairns expressly declined to decide the question which had been insisted upon in this case. In his judgment, he said: "The Great Western Railway Company say 'at the time the Act passed, we possessed under this contract, and by the authority which Parliament gave us to build a hotel and to demise it, a power of supplying it with gas, and we submit we are entitled, if so minded, to supply the hotel with gas upon any terms and conditions we think fit.'" But he went on to say that it was impossible for the Court to judge whether the act of supplying the hotel with gas would be an infringement of the Act of Parliament, until it was shown to the Court that it was going to be done, and in what manner it was going to be done. Lord Justice Rolt, at the end of his judgment, said very much the same thing; and I confess I am unable to see why that judgment, with reference to the existing rights already ascertained at the time of the passing of the Act, and that under the circumstances there was no ground for an injunction, was supposed to prevent the Courts below arriving at an independent judgment in this case. I dismiss altogether this case to which I have referred. It seems to me of no authority in determining the question now before us. Turning from the supposed conclusion of the learned Lords Justices, it seem to me that but for the just weight and authority attributable to their names, this case was hardly arguable. The Act of 1860 was intended, and expressed to be so intended, to give a monopoly to the different districts created by the statute itself, and in looking at what the statute gave it will be as well to look at the language of the statute itself as exhibiting the purposes for which it was passed. The statute says that to give effect to the bargains entered into between the different companies not to interfere with each others districts, certain things should be enacted. It is recited that the companies concerned had agreed, so far as was possible, each one to confine its supply to a separate district, in order to economize capital and avoid the too frequent opening up of public streets, and it proceeds to say that for the purpose of giving effect to the agreement the Act is sought to be passed. The first observation that strikes me, apart from the question raised as to what is the exact point at which the property in the gas changes from the vendor to the vendee, is that they should see the language of the contracts into which these companies had entered. The contract was to confine the supply to their own districts. What would anybody suppose to be the meaning of that? "District," of course, was an abstraction. It was the customers living in a particular district who were to be supplied with gas, and though it seemed important to observe the mode in which the Legislature had described that aggregate of persons who were taking gas, yet, when one considered what the companies were dealing in, it was very important to notice that the district which was so covered, and was mapped out by Mr. Sothern Estcourt, was to be a district in which the supply was to be, so far as was possible, confined to each particular company. When one saw this provision: "In all cases where the map shows houses or premises fronting a number, where numbers exist on the streets included in the district, the boundary of the district is to be taken as the rear of such houses and premises;" is it not manifest that there no question of pipes or meters or mains is referred to, but what is referred to is that the house or premises to be supplied with gas are so to be included in the district that where the front of the premises is in the district, to avoid any question, the rear shall also be included? What is the problem now submitted to us for a solution? A variety of ingenious suggestions have been made, and difficulties pointed out, on behalf of the respondents, but it is enough for me to decide this case on the facts, without any extraordinary or artificial hypothesis which might be introduced for the purpose of showing how an exact construction of the statute might lead to disagreeable results. What has been done in this case is this. I think it is not immaterial to regard the mode in which each of these persons engaged in the transaction, which they both understood, described the transaction which was being effected by them. A gas company supplies within its district certain works. The railway company is dissatisfied with the price. They think, as they take a very large amount of gas, that they ought to receive a discount upon the large amount of money they pay. The gas company refuses to make a reduction. The railway company applies to another gas company to supply them, and they consent to do so at a cheaper rate than the rival gas company. That appears to me a clear invasion. If they could do it without infringing the letter of the statute it would be a clear invasion of the Act of Parliament. The Act of Parliament had intentionally created a monopoly. If by any mechanical means a gas company could defeat the monopoly which was the intention of the statute to create, in my judgment it would be unlawful, because it would be an invasion of the monopoly the Act of Parliament intended to create to each gas company with respect to the supply of a particular district. But let us see whether they did not infringe the letter of the statute. There is nothing in the statute which describes the particular mode by which the gas is to be supplied. I think one may assume that, dealing with such a subject, those who framed the Act must be supposed to have known how gas is supplied. How is it supplied? It is supplied by mechanical means in such a form as, when going from one place to another, it shall at some point or another pass through a machine devised for the pupose of measuring the cubic area of the gas passing through; and it shall be paid for at a certain rate. The operation does not stop there. The supply does not stop there. The thing which is being supplied is the gas, and if the pressure applied within the district A sends it into district B for the purpose of consumption in district B, can it be gravely contended that is not a supply in district B? Suppose they had said "you can suck the gas through as you like, but we have nothing to do with it after it passes the meter." Mr. Rigby admitted that the exigency of his argument required the admission that if it were thought convenient, according to his view, the whole of a surrounding district might have meters inside the area of supply of a particular gas company while the whole of the gas consumed was outside the area within which the Act of Parliament applied. It seems to me that reduces the whole question to an absurdity. The framers of the Act of Parliament knew what they were dealing with. They knew gas was supplied in a particular way and by a particular means. Then it is said gas is used for other purposes than lighting and heating, such as for balloons or to be carried in bags for use in magic lanterns. No one denies that, and I think it would be an absurdity if a supply of that kind were confined to the district in which the gas was made. The simple answer is that the Act of Parliament is dealing in a common sense way with what every one was familiar with, namely, the supply, by means of pipes passing through the streets, of gas for lighting purposes. The Act did not intend to create a monopoly for such abnormal uses as those to which I have referred. The gas is to be of a certain illuminating power, there is to be a certain amount of pressure, there are to be meters to show the quantity of gas consumed. The whole of the Act is directed to one object, providing sufficient illumination for the district. The argument has reduced itself to this absurdity, that inasmuch as the Act of Parliament does not prescribe that the gas must be supplied by meter, but may be supplied by contract between the parties, that this monopoly created by the statute will not be applicable if you burn by meter, but if you burn by contract it could be stopped as an innovation of the monopoly. What reason or sense could there be in such a distinction? The Act of Parliament meant what it said, that the supply of gas was to be confined to the district in which the monopoly was created. I am not certain that I have not said more than the difficulty of the case demanded. Its influence, no doubt, is very great, because it affects gas all over the metropolis. I must say, the moment the facts are understood, and the authority of the two learned judges referred to is out of the way, the question could not have been in debate at all. It is hardly arguable that this is not an intentional interference with a monopoly created by statute. It is an express infringement. From what I have

said it will be seen that in my opinion this judgment cannot be sustained, and I, therefore, move that the judgment appealed from be reversed, and that the respondents pay to the appellants the costs of the appeal.

Lord Fitzgerald said: I have by accident left behind my notes of this case and my notes of the judgment I intended to deliver, but possibly that is rather fortunate than otherwise. After the judgment of the noble and learned Lord Chancellor, it is not necessary to be so precise. I have read the 140 pages of the Imperial Gas Light Company case, and no one can help coming to the conclusion that had it not been for an unfortunate error, that decision would have been exactly the reverse of what it is. There is nothing in the decision beyond the *dictum* of Lord Cairns, and even that *dictum* was deprived of some of its importance by his lordship's own expression in unhesitatingly saying that they decided nothing on the construction of section 6 of the Act of 1860. Turning from that to the main question, I would only say that I concur in the observations which the noble lord has made. I concur with him that if we were to adopt in this particular case the construction put upon the Act by the very learned and astute argument for the respondents, it would enable the respondents, in conjunction with the Railway Company, to evade the provisions of section 6 of the Act, and enable the respondent company to evade the obligations they undertook, which ought to be honorably and faithfully fulfilled, and to defeat the operation of the Act of Parliament. Nobody can doubt that there has been a supply of gas to the Railway Company by the respondents through the mains, and that such supply is an evasion of the Act of Parliament.

Lord Herschell: I am of the same opinion, and I have little to add. The appellants complain that the respondents are supplying gas on sale within the limits allowed to them by Act of Parliament, and the question is whether what the respondents are doing is giving a supply within those limits; but they say the meter by which the gas supply is measured is outside the limits of the appellants and within their own limits; and that, therefore, that must be taken to be the place where the gas is supplied, and that they do not supply gas outside their limits. That depends upon what is the meaning of the language used in the 6th section—in what sense are the words "supplying gas within the said limits" used. In order to judge of that we are entitled to look at the other provisions of the Act. I look at the preamble, and I find that the Act was passed to carry out an agreement with the companies that each one should confine its supply to a separate district. In what sense is the word "supply" there used? It seems to me obvious that it refers to supply for use in that district. Again, in the earlier part of the 6th section, power is given to alter the district when it is shown that any gas company is not in a condition adequately to supply gas to their respective districts. There, again, it appears to be obvious that what the Legislature had in contemplation in using the word "supply" was to supply it for use in this district. It seems to me to consider the word "supply" as applicable to the supply at any number of meters within their district, although the gas was for use in another district, was wholly out of the question. It would, in my opinion, manifestly defeat the intention of the Legislature if the construction of the respondents were to prevail, so far as that intention indicates a desire to create a monopoly to the several companies in their respective districts, to prevent competition and consequent excessive expenditure. I cannot myself conceive that the Legislature intended to determine the way the gas was supplied within the meaning of the word by the place where it was to be measured. No doubt, in a certain sense, it may be said the property passes at that point, but to say that the company, although the gas passed through their mains to the place of use, for the purpose of giving light or heat, is or is not supplied according as it is or is not measured within the limits of the company within whose limits it is used, would be a most unreasonable construction to put upon the Act of Parliament. But it is said that the 14th section of the Act shows that in the present case the Railway Company were actually entitled to require the respondents to supply them with gas for these premises, and that consequently it would be a breach of duty upon the respondents' part not to give that supply which under the Legislature they were compelled to give. It is said the Railway Company's premises were in part situated within the district of the respondents, and that being so situated the company were entitled to require them to provide a supply of gas for the purpose of being used on the premises. That turns upon the construction of section 14. First of all, whether the Railway Company were not already supplied with gas. If they were the section does not apply. Next, whether the section intends to give the right to demand a supply for the whole premises or only such part as are within the limits. If the latter is the case, the section would be inapplicable to support the contention of the respondents. It is not necessary to determine either of these points, because it appears to me that these various buildings of the Railway Company were not one premises within the meaning of section 14. I think it would be most unreasonable to put such a construction upon the section. They are, no doubt, all under one ownership, but all buildings under the same ownership, covering however great a portion of ground, could not be treated as one premises for the purposes of the Act. They have this in common, that they serve certain railway purposes, but the same might be said of the railway from its starting point to its terminus. Some more limited construction must be put upon the word "premises," and the respondents have not made out that any part of the premises, the lighting of which is complained of, is within their district. That being so the 14th section is inapplicable; but I think it does throw light upon the question, and points in the same direction as the other provisions, and it seems to show that the intention was not to give a supply of gas at large. All the provisions of the Act have relation to supplying premises or buildings, for the demand is to be one which enables them to call upon the company to provide sufficient communication of service and other pipes, and to give a supply of gas for the purpose of being used in or on the premises. It is strictly limited to the sufficiency of the pipes for the supply of the premises. All these considerations lead me, without hesitation, to the conclusion that in the present case the company are in contravention of the Act of Parliament, supplying gas within the appellants' limits. It is said where a consumer obtains a supply through a meter within the limits, and the premises of the consumer extend within the limits of another company, the first company could not prevent his doing what he liked with the gas as soon as it passed through the meter, and that he could carry it to any part of his property outside their limits. I do not stop to inquire whether that is the case. I am by no means sure that it can be done. I am not satisfied that the company whose gas was carried into the limits of another company could not prevent it. But whether that be so or not, that is not the case here. The pipes were laid down by the respondent company for the very purpose of conveying this gas, and of supplying it for use in the buildings of the Railway Company, which were outside their own limits and within the limits of the appellant company. Under these circumstances I have no hesitation in concurring with the view of the Lord Chancellor.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

A SIMPLE and successful method recently adopted for the demolition of a high chimney is thus described. The stack, which was 100 feet in height by 10 feet square, stood on the Griswold mills property, New Bedford, Mass. The structure was undermined by knocking out the bricks on the west and north sides, and shored up by planks placed in the apertures, the planks being thickly coated with tar and kerosene. The time for pulling down the structure being at hand, the planks were set on fire, when, as they became sufficiently burned to cease to support the chimney, the mass settled out of the perpendicular to the north, then cracked and fell with a crash to the ground. The topmost bricks were scattered over a large area, and the heavy iron coping was broken into a number of pieces. Along the length of the chimney, to the height of 60 feet or 80 feet, masses of brick, for a length of 2 feet or more, clung together and did not break up.

LAST week we made brief mention of the success which attended the auction sale (on August 19) of $175,000 new stock in the Consumers Gas Company, of Toronto, Canada, issued under authority of an act of the Canadian Legislature, passed in 1887. The issue was sold by Messrs. Oliver, Coate & Co., who offered it in 10-share lots (par value of shares $50), and although a good attendance was in waiting, the figures realized were slightly lower than those obtained last July, when the range was 176½ to 177. The purchasers who paid $175 per share were: H. C. Hammond, 2,020 shares; T. R. Wood, 20; C. C. Baines, 20. Those who paid $175½ were: H. S. Northoup, 180; T. R. Wood, 400; P. Brown, 20; Henry Cohen, 40; C. C. Baines, 30; W. Baines, 20; I. Gilmour, 40; W. Fenwick, 20. On the day following the auction sale, at the local stock exchange, buyers offered 176 for the shares, holders asking two points higher. The Consumers Company's credit is pretty good with local capitalists, which is considerably more than can be said in respect to the way in which the moneyed men hold the local electrical enterprises; although the projectors of the latter, it must be said, stand better with the local authorities than the Gas Company does—that is, when it comes to a question of granting public favor, etc.

IN our issue for August 19th we gave the average illuminating power of the gas supplied by the Consolidated Gas Company of Baltimore, for the week ending August 9th, as 25.10 candles, and quoted the local Gas

Inspector, Mr. P. B. Wilson, as authority for the statement. We thought at the time that this was rather a low average, for the Company had been distributing a very high candle power gas, and our surmise was correct. An examination of the official figures shows that the average for the week in question was 27.68 candles, and that the average for the first three weeks of August was 27.94 candles.

SOME time ago a committee to report on a plan of harmonizing electrical and insurance interests was appointed at the instance we think of the National Electric Light Association, and the following is an abstract of the report that was presented: 876 circulars were mailed to that number of companies, and but 241 replies were received. Of the 241 responding 172 were insured and 69 had neglected to take such precaution. The uninsured in many cases explained that either the rates were too exorbitant or insurance was refused. The amount of insurance carried by the 172 insured companies (year ended April 1, 1888) was $2,970,540, entailing a premium payment of $41,319.81. The losses collected were $21,597.61, showing that the insurance companies retained 48 per cent. of the premiums received. In the following year the amount of insurance on central stations, as far as reported, was $3,099,473, involving a premium payment of $51,565.51. The fire losses paid that year amounted to but $11,000. Total for the two years:

Insurance.	Premiums.	Losses Paid.	Per cent Loss to Premiums Paid.
$6,070,013	$92,885.32	32,597.61	36.2

The average amount of insurance on each station is $18,841.50. Out of the number of central stations responding to the circulars it was determined that 66 per cent. were housed in brick buildings; 22 per cent. in wood; 7 per cent. in stone; 5 per cent. not known. But 69 stations out of the 234 were built expressly for electric lighting purposes and exclusively used for that purpose. In looking into the causes of the fires that occurred it was found that 31.4 per cent. of the losses were occasioned by tramps setting fire to stables in proximity to stations; spontaneous combustion, 28 per cent.; crude oil for fuel, 8 per cent.; wooden roofs over boiler, 1 per cent.; lightning, 2.10 per cent.; oil waste under engine room floor, 2.10 per cent.; sulphuric acid, 2.10 per cent.; unknown, 31 per cent.

WHEN the Hackensack (N. J.) Commissioners advertised last spring for bids for lighting the streets of that town, the lowest bid was that of the Edison Electric Light Company, to which the contract was awarded, on condition that the lights should be in readiness by August 1st, when the contract with the Gas Company would expire. The Commission and the enemies of the Gas Company were in high feather over the arrangement, and "pointed with pride" to the manner in which they had conducted the negotiations. But delays, vexatious and annoying, were encountered. The Edison Company put forward flimsy excuses for not signing the contract; next, the Company failed to file the bond called for in the specifications "for the faithful performance of the work." August approached, but the contractors had not even secured a lot on which to put up their buildings. Then the contractors prayed for an extension of time to September 1st, which was allowed. September is at hand, and the only token that the town is to have electric light is found in the presence of a few poles that were unloaded at the depot. The gas contract has expired, and the streets are not in darkness simply because the Gas Company liberally agreed to light the lamps under the terms of the old contract. One of the Commissioners, in answer to some queries recently put to him respecting the failure of the contractors to go on with the necessary preliminary details, said: "We are astonished at the course of the Edison people. All the satisfaction we can get from them is the statement that they are waiting for the organization of a 'local company.' But we have a contract with the Edison Company, not with any 'local company,' and, so far as the latter is concerned, we can hear of no local organization in Hackensack. If the Edison Company had not put in its bid, we could have made a contract to light the streets every night and all night with the Gas Company at a lower rate than we are now paying for lighting them till 1 A. M. on moonless nights. We can scarcely think that the Edison Company's low bid was put in only to shut out competitors; yet that is what the public is coming to believe. We shall bring the matter to a head on September 1st. If the Edison Company does not by that time set about fulfilling its contract, we shall advertise again for bids, and shall let the public know why we are compelled to do so." The guilelessness of that Hackensack Commissioner is about on a par with the innocence of the Edison Company, which patiently waits for the formation of a "local company." If the local capitalists are wise, the "local company" will never be organized by means of their cash. No; better let the "parent company" have the whole plum.

THE Ogden (Utah) City Gas Company reports a flourishing business, although a good portion of the increase is to be charged to the series of accidents that recently befell the local electric lighting company.

WE note the formation of a partnership between Mr. W. Simpkin, M.E., and E. C. Hillyer, M.E., who are to carry on the business of consulting and constructing mechanical engineers, at 1,105 Main street, Richmond, Va., with foundry and iron works at Newport News, Va. Mr. Simpkin is not unknown to the gas fraternity, for he had been for years Superintendent of the Tanner & Delaney Engine Company, who had charge at one time or another of extensive contracts for gas works buildings and equipment. Mr. Hillyer is also widely known throughout the country, as proprietor of the Warwick Iron Works, and from his former position of Chief Designer to the Patapsco Bridge Company, of Baltimore, as well. Messrs. Simpkin and Hillyer propose to try for their share of favor from the hands of the gas men, and it is with pleasure that we welcome them to the field.

IN connection with the new firm named above we may also say that they have just closed a contract with the Trustees of the Richmond (Va.) City Gas Works for a series of plant extensions.

THE Carlisle (Pa.) Gas and Water Company has decided to adopt the Thomson-Houston system of incandescent electric light supply. This is in addition to the arc division of its business, which has been carried on with fairly good results for some time back.

MR. WILLIAM DINSMORE, President of the Union Gas Light Company, Brooklyn, N. Y., resigned that position about a fortnight ago. He was succeeded by Mr. Samuel Young. Miles A. Brown was chosen Secretary and Treasurer.

THE Georgia Gas Improvement Company, Chattanooga, Tenn., has applied for letters of incorporation. The application is made by Messrs. W. A. Hemphill, C. A. Collier, T. P. Westmoreland, Jas. M. Couper, and Geo. M. Trayler. As we understand it, the Company proposes to manufacture, use, and sell the Allen-Harris and A. M. Sutherland patented processes and apparatus for the manufacture of gas.

MENTIONING this recalls the fact that Mr. Harris is no longer connected with the Standard Gas Light Company of this city, whose managers have decided "not to begin the construction of another station in the city this year." Stations cost money.

WE regret to announce the death, at his home in Germantown, Pa., on the evening of Aug. 21, of Mr. William Wright, Superintendent of the Manayunk gas works. For many years Mr. Wright had been in charge of the Germantown water works.

THE contract for illuminating the buildings and grounds of the Detroit Exposition provides for the maintenance of 250 high candle power arcs and about ten times that number of incandescent lamps, Edison type.

THE Lehigh Valley Railroad Company has purchased the old gas works site, at the west end of the Jordan bridge, Hamilton street, Allentown, Pa., for the purposes of its new passenger station.

THE proprietors of the San Jose (Cal.) Light and Power Company have determined to rebuild the coal gas benches dismantled some time ago to permit of the manufacture of oil gas. In fact, we understand it is virtually a new coal gas plant that is to be installed on the San Augustine street site, and that it is to be constructed on the latest modern plans. The Company is also preparing to add an incandescent plant to its present lighting outfit.

THE Globe Lighting and Heating Company, in an application for an injunction filed in the United States Circuit Court, Chicago district, seeks to restrain the city of Chicago from infringing on vapor burners used in gasoline street lamps. Complainant claims to be the exclusive owner of W. P. Butler's patent for the burners, and up to a recent date supplied the city with lights of the gasoline type. This contract having expired, the city made an agreement with a certain West Side firm to perform the lighting, and complainant asserts that this firm's burner is a clear infringement of the Butler patent.

LAST April, when the Allegheny (Pa.) Light Company received the contract for the lighting of the city by means of arc lamps, the force of outside workmen was correspondingly increased. The additions to the "outside force" included 4 carbon setters, who were engaged with the

understanding that their pay should be at the rate of $1.75 per day, the same to be increased to $2 per day when "they should have become proficient in their work." The "green hands" concluded, on July 1st, that their amateurish days were over, and accordingly applied for the promised $2 stipend. This request was turned over by foreman Dailey to General Manager Blaxter, who did not seem to be in any hurry over rendering a decision. Towards the end of August the men again preferred their request, but without satisfactory results. Thereupon the entire outside force—10 carbon setters, 12 linemen, and 4 inspectors—refused to go on with their work, and much confusion in the lighting system was experienced.

SOME months ago we noted that the authorities of Watertown, N. Y., granted a franchise to Winfield M. Clark and John D. Brown for the operation of an opposition gas company—the Union—in that city. At the time we did not have much faith that the people behind the scheme were desirous of building a works, and in fact plainly said that the intent was to compel the owners of the Watertown Gas Company to either sell their property or to purchase the franchise of the new-comers. One of the provisions of the franchise was that the Union Gas Company should within a named period submit a bond that would be satisfactory to the City Council. This bond was presented to the Council early in August, and the committee to whom the bond was referred reported back to the Council that the bond was unsatisfactory. As a consequence the following action was taken. On motion of Ald. Holbrook, it was resolved "that the bond offered by the Union Gas Company, purporting to comply with section eight of the provisions of the franchise granted by the city is not satisfactory, for the reason that the sureties are men whose responsibilities are unknown, who reside at a distance and have not justified in any amount, and this Council hereby refuses to approve or accept said bond, and the Chamberlain is directed to return the same to said Gas Company." This having been adopted unanimously, Ald. Murray settled the Union schemers in the following manner: "*Whereas*, The Union Gas Company has failed to comply with the terms and conditions of the franchise granted on May 21, 1889; therefore, *Resolved*, That said franchise be and the same is hereby revoked entirely." This was passed by unanimous vote. The moral derivable from the Watertown application, grant and refusal is quite plain. If the authorities had acted with ordinary discretion in May they would not have had to eat so much humble pie in August. However, we suppose it is only fair to be satisfied with justice in August, since the latter wipes out the injustice of May.

BOSTON advices are to the effect that 65 has been freely bid for the common stock of the Bay State Gas Company.

IT is said that a bed of coal, especially available for gas making purposes, has been discovered near Santa Clara, Cuba. The report is probably a hoax.

A WRIT of *certiorari* has been issued by Judge Barrett, of the New York Supreme Court, requiring State Comptroller Wemple to show cause in the General term of the Supreme Court, Third Judicial District, why the taxes assessed on the Edison Electric Light Company should not be reduced. The petition of the Company states that it is a consolidation of the Edison Electric Light Company and the Edison Company for Isolated Lighting, and that its capital stock is $1,600,000. This capital it is alleged is very largely employed outside this State, the Company owning stock in 62 companies in other States. In 1886—the year of the organization—it is alleged the Company had invested in outside plants, $40,000; in 1887, $105,000; and in 1889, $125,000. It also alleges that 75 per cent. of the capital is employed outside of the State. Comptroller Wemple, on July 24, gave the Company notice that the taxes on its capital stock for the three years ending November 1, 1888, had been fixed at $4,950. The Company urged that an allowance ought to have been made for that part of its capital not in this State.

THE residents of Bordentown, N. J., are complaining about the quality of the gas light supplied them since the Gas Company changed its method of manufacture.

THE recent issue by the Newark (N. J.) Gas Light Company of one-half million dollars of certificates of indebtedness does not seem to have made more than the slightest impression on the value of the Company's stock. For instance, before the issue the shares were quoted at 215, whereas to-day the stock is bid for at 207.

THE Trustees of South Orange (N. J.) have authorized the Citizens Gas Light Company, of Newark, to carry on the public lighting for a term of three years.

WE are told that the gas rate in Richmond, Va., has been reduced to $1.25 per 1,000 cubic feet, but have not been officially so informed.

THE authorities of Allentown, Pa., are considering the advisability of installing a municipal electric lighting plant in the old water works buildings. Water power could be employed. In any event the matter could not take practical shape for two years, for the Allentown Electric Light and Power Company's contract, under which it performs the public lighting, has two years of life.

A SUIT for damages has been commenced at Youngstown, O., by the Home Gas Fuel Company against the Bridgewater Gas Company. Complainant asks for $150,000, from defendant's failure to furnish it with gas, as per contract. Defendant admits the contract, but claims that its failure to keep the same is because of the failure of the gas wells.

THE Beverly, Mass., Gas Company is arranging to supply power from its electric annex.

THE Haverhill (Mass.) Gas Company is making large pipe extensions in the neighboring village of Bradford.

THE Trustees of St. Thomas Episcopal Church, Taunton, Mass., have arranged with the Gas Company to locate an Otto gas engine (1-horse power) in the cellar of the edifice, for the purpose of operating the organ.

THE rejuvenated Spencer (Mass.) Gas Company reports that over 100 gas stoves were sold in that town this season. The total number of such stoves now in use there is returned at 360.

ARTICLES incorporating the San Diego (Cal.) Gas Light Company have been filed by Messrs. H. E. Hanshowe, E. S. Babcock, Jr., E. E. White, E. W. Britt, and Chas. F. Hinde. It is capitalized in $750,000. The articles set forth the intention of the projectors to manufacture and supply gas for fuel and lighting purposes, and also to supply electricity. It is surmised that Jno. D. Spreckels and E. S. Babcock, Jr., who are largely interested in Coronado Beach, a pleasure resort close by San Diego, are responsible for the initiation of this opposition movement, being impelled thereto by the refusal of Dr. Powers, Manager of the old Company, to furnish gas to the several beach hostelries and places of entertainment at a rate determined on by Mr. Babcock. Dr. Powers, who is a man not given to over-statement, when asked as to what course his Company would take, replied: "If the new Company wants to buy our plant they will pay our price: if it wants to fight, we are in the field; and if they want gas laid on at Coronado Beach they will have to pay what we deem a reasonable charge." The old Company is in every respect equipped to supply all the gas needed in San Diego.

A MEETING of the stockholders of the Gate City Gas Light Company, of Atlanta, Ga., is called for Thursday, Sept. 26. Besides an election for officers and directors, other business of importance will be brought before the meeting.

THE Putnam (Conn.) Light and Power Company is equipping its dynamo station. The house for the same (a 1-story brick building, 20 ft. by 32 ft.) is located on the old gas works site.

THE second installment ($100,000) of gas bonds, the proceeds of which are to be devoted to the construction of the municipal gas works at Hamilton, O., was taken by the First National Bank, at its bid of $100,799.

THE annual meeting of the Providence (R. I.) Gas Company is to be held at noon to-day.

AMENDED articles have been filed for the incorporation of the Portsmouth (O.) Gas and Electric Company. The capital stock of the consolidated enterprise is $100,000.

THE Charlestown (Mass.) Gas Company pays taxes amounting to $1,260 per annum in the Somerville district.

THE alterations now being made on the plant of the Olympia (W. T.) Gas Company will virtually double its capacity.

DURING the past season Supt. W. H. Judge, of the Rock Island (Ills.) Gas Company, has busied himself with thoroughly overhauling the main and service systems. That the work has been carefully and systematically carried out goes without saying; for Brother Judge's motto is never to do things by halves. In connection with this we might also remark that the Superintendent has caused the distribution system to be so valved that the supply can be shut off from any desired district

of the city—say, for instance, during a fire, or when repairs are to be made to the lines of pipes.

As was intimated in the JOURNAL would be the case, the Washington (D. C.) Gas Light Company has filed a bill against the District Commissioners and the Electric Heat and Power Company, asking that an injunction be granted to restrain defendants from laying any more conduits. Petitioner recites that Congress at its last session appropriated $115,000 for lighting the streets, and the appropriation bill provided that not more than $20 should be paid for each lamp, which should burn not less than 2,600 hours per annum. The Commissioners, however, have power to substitute any other illuminating vehicle which they may see fit, but they cannot make a contract to last for more than one year. Complainant says that it has heretofore complied with the terms of the contract, and follows this up by remarking that the contract entered into with the Electric Heat and Power Company by which the latter is to light all the city north of K street, between Frst street and Rock Creek, will exceed the appropriation many thousands of dollars. The bill further recites that Congress, in its use of the clause "illuminating vehicle," did not intend to include electric lighting. In the opinion of the petitioner a franchise is sought to be conferred upon the defendant to tear up the streets of the city at will. Another claim is that Congress, through the act of July 18, 1888, forbade the introduction of electric light wires in the District either above or below ground—therefore the Commissioners had not power to make the contract. Petitioner further urges that it is ready to prove that the type of electric light owned by the Company is totally unfit for use, and has been so found in large cities. On these grounds petitioner asks for an injunction to restrain the Company from further work on the streets.

On motion of Ald. Delaney, the Troy (N. Y.) Aldermen have authorized the Troy Gas Light Company to build and maintain a railroad along the northerly line of Washington street, from the southerly line of the Gas Company's property to the track of the Union Railroad Company. This spur will be of great assistance to the Company in the instance of facilitating the transmission of supplies, etc.

The Holyoke (Mass.) Gas Light Company's retort house is being enlarged and improved. Recuperative furnaces form a part of the new installation.

Montreal now enjoys (?) public lighting by electricity, but many of the residents are old-fashioned enough to cling to the belief that—and particularly in the sections in which incandescent lamps are used—the streets were better lighted when the contract was in the hands of the Montreal Gas Company.

Mr. Addicks has not yet begun construction work on that promised gas plant for Wilmington, Del.

Some time prior to the expiration of the franchise of the Ann Arbor (Mich.) Gas Company, a motion was made in the City Council for an extension of the same for 30 years. The extension was based on the lines of the old measure, and was adopted without dissent. Mayor Beakes, however, vetoed the ordinance on the ground that its provisions were "illiberal to the citizens." In his message to the Council the Mayor also said that Ann Arbor should not be called on to pay higher rates for gas than those which ruled in cities similarly circumstanced. As a consequence of this action an amended ordinance was presented, in which it is specified that the maximum rate to private consumers shall not exceed $2 per 1,000 cubic feet, the city not to pay in excess of $1.50 per 1,000.

Negotiations are about completed for the absorption by the Amherst (Mass.) Gas Company of the local Electric Light Company.

The Bloomfield (N. J.) Town Committee have advertised for bids for performing the public lighting by electricity. The Montclair Gas and Water Company will put in a tender.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

Mr. Egner Makes a Claim.

ENGINEER'S OFFICE, LACLEDE GAS LIGHT COMPANY,
ST. LOUIS, August 23d, 1889.

Editor AMERICAN GAS LIGHT JOURNAL:

In the London *Journal of Gas Lighting* of Aug. 6, 1889, there appears a description of "The Loomis Gas Process."* As the writer understands the article referred to, in which, of course, he may be mistaken it is claimed therein that by the Loomis device it was first possible to use bituminous slack to make producer, fuel, or water gas; and, furthermore, that this was due to Mr. Loomis's discovery that this could only be done successfully by using an exhauster to draw the air down through the fuel in the generator. The said description is particular in mentioning the fact that Mr. Loomis believes the down draft to be the only right principle. But he claims in effect that he was the first to be able to make (effectively) water gas from bituminous slack, and to have discovered the feature of drawing the air through the fuel bed in the generator down by means of an exhauster. Mr. Loomis's first four patents for water gas apparatus were taken out in this country on March 30th, 1886, the applications having been filed in the spring of 1885; but the exhauster feature of the invention is not claimed in the above patents. The first special reference to that feature appears in a patent (U. S.) granted to Mr. Loomis May 28th, and the applications for which were filed Feb. 23d, 1889 (?). In Sept., 1884, the writer filed an application for a U. S. patent, which was granted April 14th, 1885, in which the use of an exhauster for drawing air through bituminous fuel in a water gas generator, for the purpose of aiding combustion, was described, *and claimed as the applicant's invention.* Previous to this the apparatus had been erected and tried at these works, at an expense of several thousand dollars. The apparatus—in a modified form, but with that distinctive feature of drawing air to aid combustion in the water gas generator—was operated off and on for a long time; and in 1885 the results obtained were published and described and commented upon.

In view of all these facts, it seems that Mr. Loomis can not fairly claim that he was the first to successfully convert bituminous slack into water gas, nor yet that he discovered that this was made practicable, as it can only be made so, by using an exhauster to draw the air through the said fuel, and that that was his invention. Although the writer believes he was the first to discover and *operate practically*, continuously, and for a long time, these features, he may possibly not have been; for it is an old assertion which states that "there is nothing new under the sun." Yet that the writer was a long way ahead of Mr. Loomis in the matters mentioned perhaps no fair-minded person who takes the trouble to investigate the subject will deny.

In connection with the preceding lines, the following definition by an able jurist, as to what are tests of equivalency in patents, may be of interest, viz, "1st, identity of function; and, 2d, substantial identity of way of performing that function." These tests are the results of much reasoning, in the most condensed form. And here are some extracts of Supreme Court decisions in suits for infringement of patents: "A *change of form does not avoid infringement of a patent.* Even when a change of form somewhat modifies the construction, the action or the utility of the patented thing, non-infringement will seldom result from such a change." And here is another extract, from another Judge and another case: "On the other hand, a defendant's machine may be better than that covered by the patent in suit; but if that superiority resulted from some addition to the latter, it will have no tendency to avoid infringement."

The first-mentioned patent of the writer describes both the up and down draft by means of an exhauster, but more particularly claims the feature of drawing air to aid combustion through the fuel in the generator. However, that is not the only patent upon which the writer relies to prove the claim that he and not Mr. Loomis, was the first to successfully convert bituminous slack into water gas in a cupola generator. An apparatus of at least 300,000 cubic feet capacity per diem, upon my plans and patents, is now in the course of erection at these works.

Yours, very truly, FREDERIC EGNER.

*See p. 309.

The Market for Gas Securities.

Consolidated gas is one point higher than at last time of writing, and the indications are that a pronounced upward movement will speedily be witnessed. We have no hesitation in saying that 93 or even 95 will be scored before the holidays, and that ought to be sufficient dividend for those who make an investment in these shares now, provided they are willing to part with them at the festive time designated. Equitable is somewhat higher, and Mutual is steady at last quotations. Brooklyn shares are higher, as a rule, and strength is the predominating feature in these specialties. There is nothing of moment in out-of-town shares, although Chicago Trusts attract attention. These are at 60, and it is quite likely that a further advance in them will be made. Baltimore Consolidated is weaker. Mr. Edward Murphy, Jr., has been elected President of the Troy (N. Y.) Gas Company, succeeding Mr. Thos. W. Lockwood, who thus retires from a position which he has filled successfully and honorably for a long term of years.

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Persons thinking of joining the Association should read the following extract from the Constitution: "SEC. 12. Applications for Active Membership, or for Associate Membership, or for transfer from Associate to Active Membership, must be received by the Secretary at least ten days prior to the meeting at which the application is acted on." Application blanks will be furnished by the Secretary.

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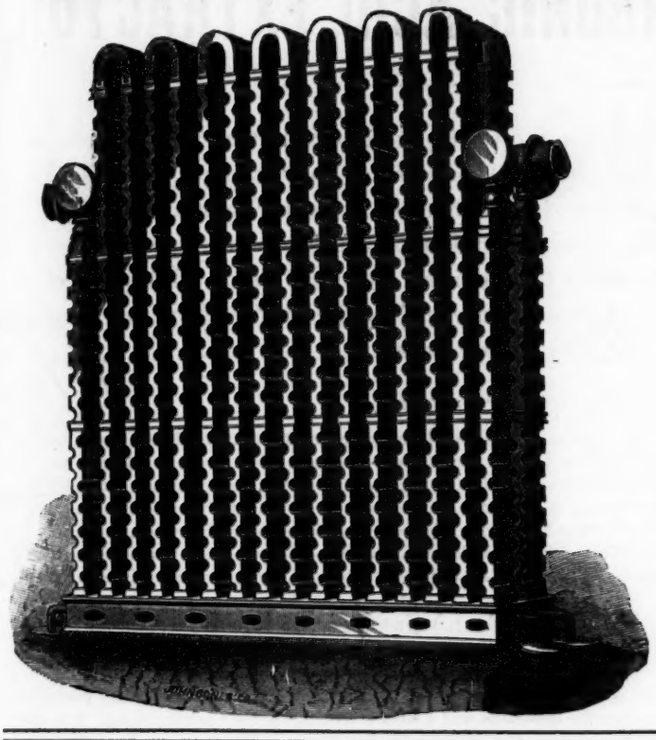

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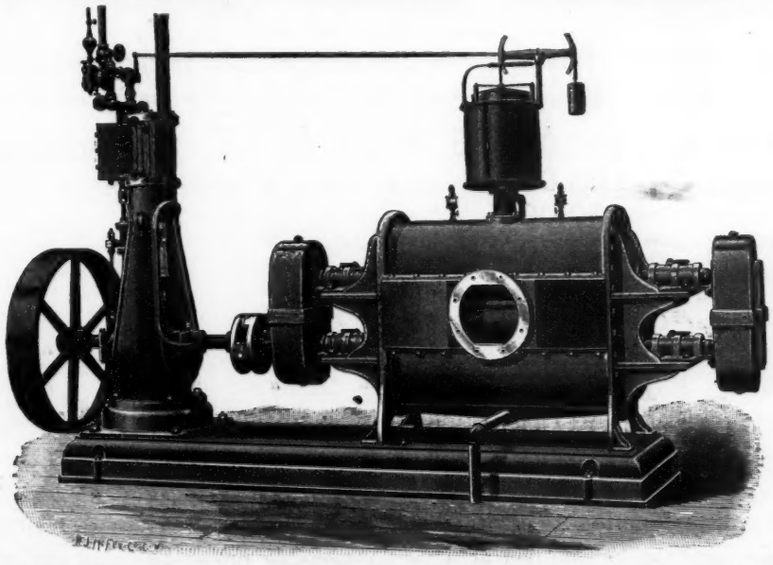

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No. 4,	"	"	500,000	"	"	"	6	"	"	"	"
No. 5,	"	"	750,000	"	"	"	7	"	"	"	"
No. 6,	"	"	1,000,000	"	"	"	8	"	"	"	"
No. 7,	"	"	1,250,000	"	"	"	9	"	"	"	"
No. 8,	"	"	1,500,000	"	"	"	10	"	"	"	"
No. 9,	"	"	2,000,000	"	"	"	12	"	"	"	"
No. 10,	"	"	3,000,000	"	"	"	15	"	"	"	"

This Tar Extractor will perform its work with about one-fourth the usual back-pressure heretofore required. It is simple in construction, and can be supplied at a very reasonable price—less than any other ever before introduced. Satisfactory results will be guaranteed in every instance.

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Elkhart Gas Lt & Coke Co.	Elkhart, Ind.
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South Bend Gas Light Co.	South Bend, Ind.
Sheboygan National Gas Co.	Sheboygan, Wis.
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San Diego Gas Fuel & Electric Lt. Co	San Diego, Cal.
Sioux Falls Gas Co.	Sioux Falls, Dak.
Dakota Gas and Fuel Co.	Grand Forks, Dak.
St. Johns Mutual Gas Co.	St. Johns, Mich.
Stillwater Gas Light Co.	Stillwater, Minn.
St. Paul Gas Light Co	St. Paul, Minn.
Emporia Electric and Gas Light Co.	Emporia, Kas.
Van Wert Gas Light Co.	Van Wert, Ohio.
Lansing Gas Light Co.	Lansing, Mich.
San Francisco Gas Lt. Co.	San Francisco, Cal.
Shelbyville Gas Light Co.	Shelbyville, Ind.
Great Falls Gas Light Co.	Great Falls, N. H.
Belleville Gas Co.	Belleville, Ontario.
Rochester Lt. and Fuel Co.	Rochester, Minn.
Northwestern Gas Light and Coke Co.	Evanston, Ill.
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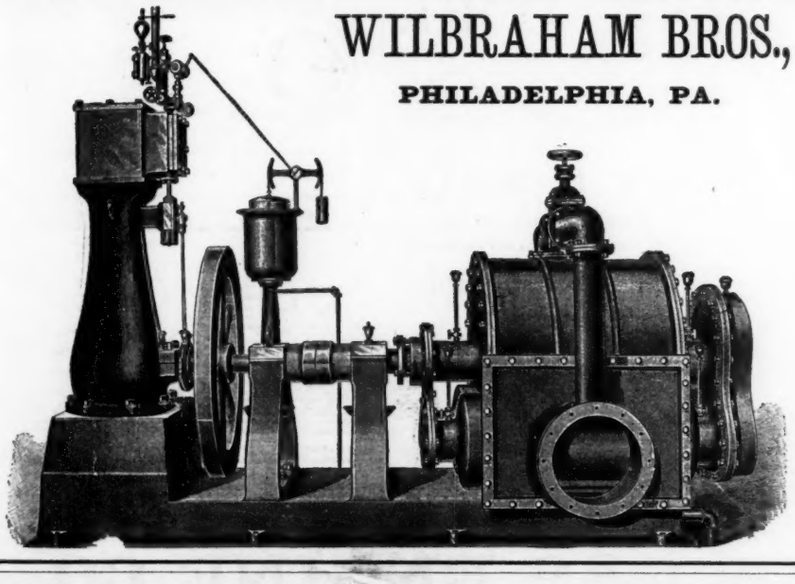

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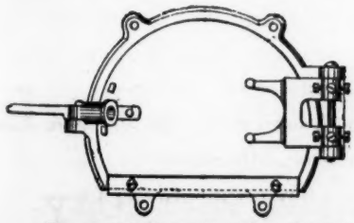

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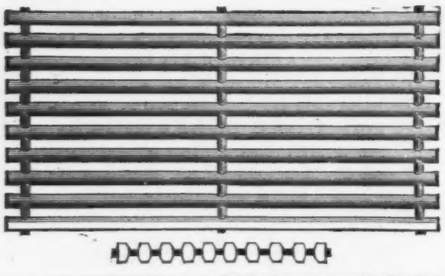

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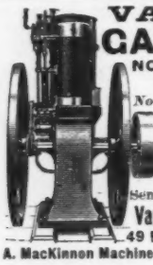

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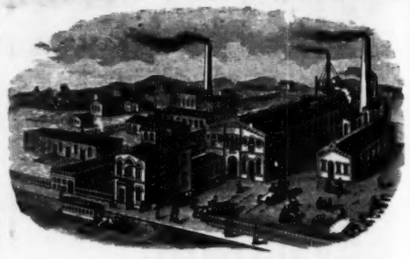

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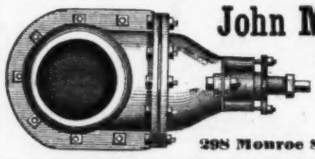

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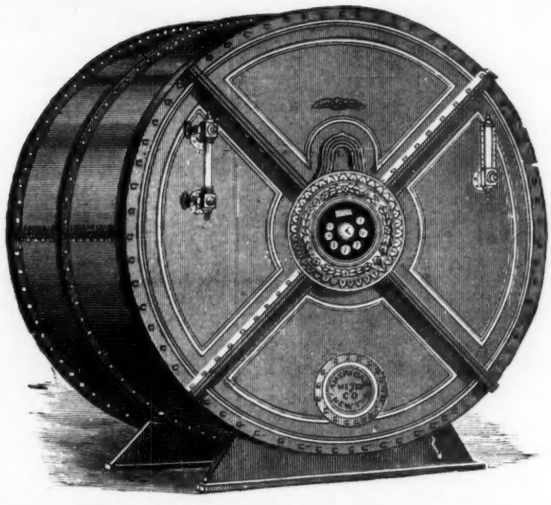

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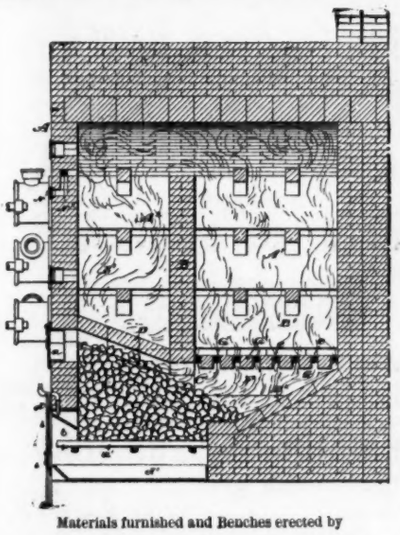

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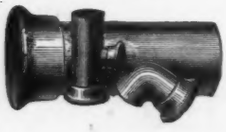

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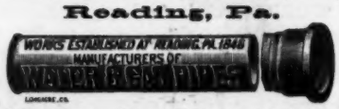

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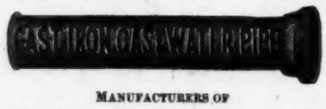

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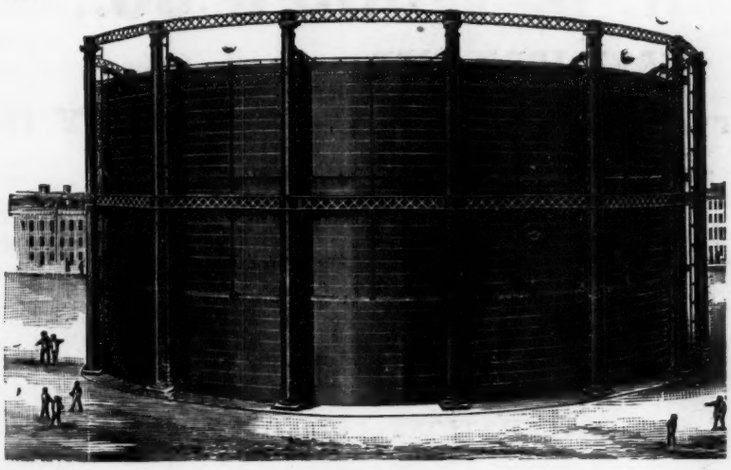

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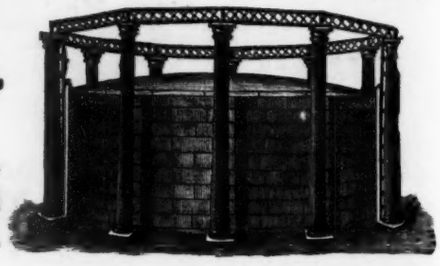

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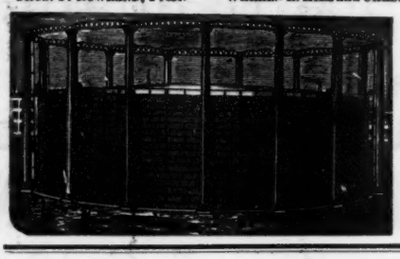
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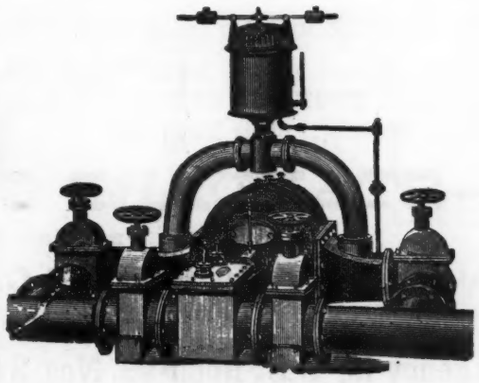
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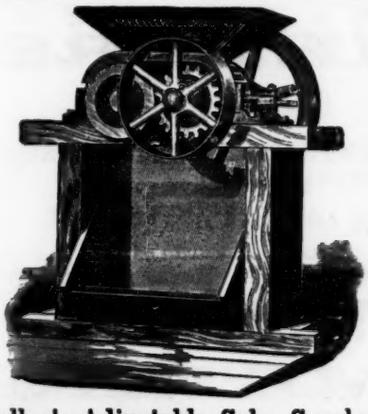

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This Stove has four burners on top, and double oven burner.

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17 in. wide.	14½ in. wide.	15 in. wide.	16 in. wide.	
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